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PTO/SB/05 (12/97)  
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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 980072 Total Pages 2

First Named Inventor or Application Identifier

Ren Judkins

Express Mail Label No. EM203499395US

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231

1. ☒ Fee Transmittal Form  
(Submit an original, and a duplicate for fee processing)
2. ☒ Specification [Total Pages 32]  
(preferred arrangement set forth below)
  - Descriptive title of the invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the invention
  - Brief Summary of the invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
3. ☒ Drawing(s) (35 USC 113) [Total Sheets 5]
4. Oath or Declaration [Total Pages 2]
  - a. ☒ Newly executed (original or copy)
  - b. ☐ Copy from a prior application (37 CFR 1.63(d))  
(for continuation/divisional with Box 17 completed)  
(Note Box 5 below)
    - i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting  
inventor(s) named in the prior application,  
see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (useable if Box 4b is checked)  
The entire disclosure of the prior application, from which a  
copy of the oath or declaration is supplied under Box 4b,  
is considered as being part of the disclosure of the  
accompanying application and is hereby incorporated by  
reference therein.

6. ☐ Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)
  - a. ☐ Computer Readable Copy
  - b. ☐ Paper Copy (identical to computer copy)
  - c. ☐ Statement verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement [ ] Power of Attorney  
(when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure [ ] Copies of IDS  
Statement (IDS)/PTO-1449 Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)
14. ☐ Small Entity [ ] Statement filed in prior application,  
Statement(s) Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)
16. ☒ Other: Request for Interference  
Declaration of Ren Judkins  
Declaration of Lynn J. Alstadt

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☒ Continuation-in-part (CIP) of prior application No. 08,756,282 and

18. CORRESPONDENCE ADDRESS Patent No. 5,630,898

☐ Customer Number or Bar Code Label

or ☒ Correspondence address below

(Insert Customer No. or Attach bar code label here)

NAME	Lynn J. Alstadt				
	Buchanan Ingersoll, P.C.				
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	301 Grant Street, 20th Floor				
CITY	Pittsburgh	STATE	PA	ZIP CODE	15219
COUNTRY	USA	TELEPHONE	412-562-1632	FAX	412-562-1041

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<h2 style="margin: 0;">FEE TRANSMITTAL</h2> <p style="font-size: small; margin: 5px 0;">Note: Effective October 1, 1997. Patent fees are subject to annual revision.</p>	<p><b>Complete if Known</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Application Number</td><td></td></tr> <tr><td>Filing Date</td><td></td></tr> <tr><td>First Named Inventor</td><td>Ren Judkins</td></tr> <tr><td>Group Art Unit</td><td></td></tr> <tr><td>Examiner Name</td><td></td></tr> <tr><td>Attorney Docket Number</td><td>980072</td></tr> </table>	Application Number		Filing Date		First Named Inventor	Ren Judkins	Group Art Unit		Examiner Name		Attorney Docket Number	980072
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METHOD OF PAYMENT (check one)	FEE CALCULATION (continued)																																																																																																																				
<p>1. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:</p> <p>Deposit Account Number: 02-4553</p> <p>Deposit Account Name: Buchanan Ingersoll</p> <p><input checked="" type="checkbox"/> Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17    <input type="checkbox"/> Charge the Issue Fee Set in 37 CFR 1.18 at the Mailing of the Notice of Allowance</p> <p>2. <input checked="" type="checkbox"/> Payment Enclosed:  <input checked="" type="checkbox"/> Check    <input type="checkbox"/> Money Order    <input type="checkbox"/> Other</p>	<p><b>3. ADDITIONAL FEES</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Large Entity Fee Code</th> <th>Small Entity Fee Code</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr><td>105 130</td><td>205 65</td><td>Surcharge - late filing fee or oath</td><td></td></tr> <tr><td>127 50</td><td>227 25</td><td>Surcharge - late provisional filing fee or cover sheet</td><td></td></tr> <tr><td>139 130</td><td>139 130</td><td>Non-English specification</td><td></td></tr> <tr><td>147 2,520</td><td>147 2,520</td><td>For filing a request for reexamination</td><td></td></tr> <tr><td>112 920*</td><td>112 920*</td><td>Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>113 1,840*</td><td>113 1,840*</td><td>Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>115 110</td><td>215 55</td><td>Extension for reply within first month</td><td></td></tr> <tr><td>116 400</td><td>216 200</td><td>Extension for reply within second month</td><td></td></tr> <tr><td>117 950</td><td>217 475</td><td>Extension for reply within third month</td><td></td></tr> <tr><td>118 1,510</td><td>218 755</td><td>Extension for reply within fourth month</td><td></td></tr> <tr><td>128 2,060</td><td>228 1,030</td><td>Extension for reply within fifth month</td><td></td></tr> <tr><td>119 310</td><td>219 155</td><td>Notice of Appeal</td><td></td></tr> <tr><td>120 310</td><td>220 155</td><td>Filing a brief in support of an appeal</td><td></td></tr> <tr><td>121 270</td><td>221 135</td><td>Request for oral hearing</td><td></td></tr> <tr><td>138 1,510</td><td>138 1,510</td><td>Petition to institute a public use proceeding</td><td></td></tr> <tr><td>140 110</td><td>240 55</td><td>Petition to revive - unavoidable</td><td></td></tr> <tr><td>141 1,320</td><td>241 660</td><td>Petition to revive - unintentional</td><td></td></tr> <tr><td>142 1,320</td><td>242 660</td><td>Utility issue fee (or reissue)</td><td></td></tr> <tr><td>143 450</td><td>243 225</td><td>Design issue fee</td><td></td></tr> <tr><td>144 670</td><td>244 335</td><td>Plant issue fee</td><td></td></tr> <tr><td>122 130</td><td>122 130</td><td>Petitions to the Commissioner</td><td></td></tr> <tr><td>123 50</td><td>123 50</td><td>Petitions related to provisional applications</td><td></td></tr> <tr><td>126 240</td><td>126 240</td><td>Submission of Information Disclosure Stmt</td><td></td></tr> <tr><td>581 40</td><td>581 40</td><td>Recording each patent assignment per property (times number of properties)</td><td></td></tr> <tr><td>146 790</td><td>246 395</td><td>Filing a submission after final rejection (37 CFR 1.129(a))</td><td></td></tr> <tr><td>149 790</td><td>249 395</td><td>For each additional invention to be examined (37 CFR 1.129(b))</td><td></td></tr> <tr><td colspan="3">Other fee (specify) _____</td><td></td></tr> <tr><td colspan="3">Other fee (specify) _____</td><td></td></tr> </tbody> </table>	Large Entity Fee Code	Small Entity Fee Code	Fee Description	Fee Paid	105 130	205 65	Surcharge - late filing fee or oath		127 50	227 25	Surcharge - late provisional filing fee or cover sheet		139 130	139 130	Non-English specification		147 2,520	147 2,520	For filing a request for reexamination		112 920*	112 920*	Requesting publication of SIR prior to Examiner action		113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action		115 110	215 55	Extension for reply within first month		116 400	216 200	Extension for reply within second month		117 950	217 475	Extension for reply within third month		118 1,510	218 755	Extension for reply within fourth month		128 2,060	228 1,030	Extension for reply within fifth month		119 310	219 155	Notice of Appeal		120 310	220 155	Filing a brief in support of an appeal		121 270	221 135	Request for oral hearing		138 1,510	138 1,510	Petition to institute a public use proceeding		140 110	240 55	Petition to revive - unavoidable		141 1,320	241 660	Petition to revive - unintentional		142 1,320	242 660	Utility issue fee (or reissue)		143 450	243 225	Design issue fee		144 670	244 335	Plant issue fee		122 130	122 130	Petitions to the Commissioner		123 50	123 50	Petitions related to provisional applications		126 240	126 240	Submission of Information Disclosure Stmt		581 40	581 40	Recording each patent assignment per property (times number of properties)		146 790	246 395	Filing a submission after final rejection (37 CFR 1.129(a))		149 790	249 395	For each additional invention to be examined (37 CFR 1.129(b))		Other fee (specify) _____				Other fee (specify) _____			
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SUBMITTED BY		Complete (if applicable)	
Typed or Printed Name	Lynn J. Alstadt	Reg. Number	29,362
Signature		Date	2/2/98
		Deposit Account User ID	02-4553

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1544 U.S. PTO

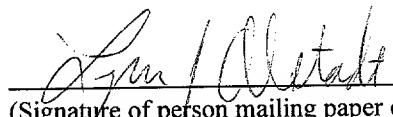
CERTIFICATE OF MAILING BY "EXPRESS MAIL" UNDER 37 CFR 1.10 - SEPARATE PAPER		ATTORNEY'S DOCKET NO.  980072
	IN RE APPLICATION OF  Ren Judkins	
	SERIAL NUMBER	FILED
	FOR  PLEATED AND CELLULAR MATERIALS	
	GRP. ART UNIT	EXAMINER

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Date of deposit February 2, 1998

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Lynn J. Alstadt  
(Typed or printed name of person mailing paper or fee)

  
(Signature of person mailing paper or fee)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit 3509 : PATENT

Examiner :

In re application of : PLEATED AND CELLULAR  
MATERIALS

REN JUDKINS :

Serial No.: Unassigned; continuation- :  
in-part of Serial No. 08/756,282,  
filed November 25, 1996 :

Filed: Herewith :

**REQUEST FOR INTERFERENCE**

Pittsburgh, Pennsylvania 15219

February 2, 1998

Hon. Commissioner of Patents  
Washington, D.C. 20231

Sir:

**Request for Interference**

Pursuant to 37 C.F.R. § 1.607, applicant respectfully requests that the Office declare an interference between the present application and United States Patent Nos., 5,692,550 and 5,701,940.

The claims of this application copy all of the claims in United States Patent Nos. 5,692,550 and 5,701,940. Applicant's claims 1 through 34 are the same as claims 1 through 34 of the '940 patent. Applicant's claims 35 through 81 correspond to and are presented in the same order as claims 1 through 37 of the '550 patent.

This application is a continuation-in-part of United States Patent Application Serial No. 08/756,282, filed November 25, 1996. This application presents drawings, namely Figures 6 through 10, that are not presented in the parent application. Figures 6 and 7 show the tabbed cellular material attached between a headrail and a bottomrail with lift cords passing through the cellular material.

In the parent '282 application applicant amended his pending claims to copy claims from the '550 patent and the '940 patent which relate to tabbed cellular material that is not connected between a headrail and a bottomrail. To the extent that these claims are entered and found allowable in the parent application, applicant is willing to cancel them from this application.

#### **Suggestion of Proposed Counts**

Applicant suggests that the interference address counts corresponding to each of the independent claims. They are claims 1, 11, 12, 18, 25, 34, 35, 44, 58 and 81.

#### **Basis upon which applicant is entitled to a judgment relative to the patentee**

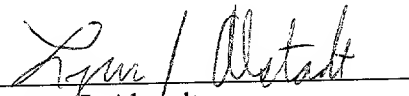
Submitted herewith are copies of a declaration of the applicant and a declaration of his counsel, Lynn J, Alstadt, filed by in the parent '282 application. Applicant's declaration alleges inventorship prior to the effective filing date of the '550 patent and the '940 patent which is March 10, 1994. Attached to both declarations is a drawing dated February 25, 1991, which shows all elements of the tabbed cellular material in the counts. Mr. Alstadt's declaration corroborates the drawing, reduction to practice and diligence. This evidence prima facie demonstrates that applicant is entitled to judgment on priority.

**Conclusion**

Since applicant has established that he is prima facie entitled to a judgment relative to the patentees of the '550 patent and the '940 patent, declaration of an interference is respectfully requested.

Respectfully submitted,

BUCHANAN INGERSOLL, P.C.

By   
Lynn J. Alstadt  
Registration No. 29,362

Attorneys for Applicant

(412) 562-1632

## **TITLE**

### **PLEATED AND CELLULAR MATERIALS**

#### **CROSS-REFERENCE TO RELATED APPLICATIONS**

This is a continuation in part of United States Patent Application Serial No. 08/756,282 filed November 25, 1996, which is a continuation of United States Patent Application Serial No. 08/412,875, filed March 29, 1995, and issued as United States Patent No. 5,630,898 on May 20, 1997.

#### **BACKGROUND OF THE INVENTION**

##### **Field of the Invention**

This invention relates to a tabbed and pleated cellular material and method for the manufacture thereof and more particularly to a window covering which contains this tabbed and pleated cellular material.

##### **Description of the Prior Art**

There are two basic types of folded window coverings. A first pleated type consists of a single layer of corrugated material. The other is a more complex cellular type where pleated layers are joined or folded strips are stacked to form a series of collapsible cells. This latter type is known to have favorable thermal insulation properties because of the static air mass which is trapped between the layers of material when the cells are in the expanded position. The single-layer type, on the other hand, is favored for its appearance in some cases, and is less expensive to manufacture. There is also a tabbed single layer of corrugated material which is disclosed in my United States Patent No. 4,974,656. The tabbed single layer of pleated material

has been sold in window coverings and been commercially successful. Consequently, there is a market for a window shade made with a tabbed cellular material.

There are two basic approaches to making cellular products and tabbed panels from a roll of fabric material. The first method pleats or bonds the material transverse to the length of the roll and the second method pleats or bonds longitudinally along its length.

The output of the transverse method cannot be wider than the roll width of the original material. The longitudinal method is limited in the types of patterns that can be printed on the material because alignment is random. The transverse methods have been limited to a single layer, a single tabbed layer or a triple layer where there are three continuous surfaces that create a panel of double cells.

There is a need to have a transverse process that can make a panel of single cells. There is also a need to increase the speed of production output of single, double and triple layers.

There are several methods of producing the cellular shades. Most similar to the pleated, single-panel method is Anderson U.S. Patent No. 4,685,986. This method joins together two single-panel pleated lengths of material by adhesively bonding them together at opposing pleats. Other methods depart from this Anderson patent by joining together a series of longitudinally folded strips, rather than continuous sheets of pleated material. Such methods are shown in Colson U.S. Patent No. 4,450,027, and in Anderson U.S. Patent No. 4,676,855. In the Colson patent, strips of fabric are longitudinally folded into a U-shape and adhered on top of one another, whereas in the Anderson patent these strips are Z-shaped and are adhered in an interlocking position.

In United States Patent No. 5,043,038 Colson discloses a method of cutting a honeycomb structure longitudinally to divide them into two tabbed single layer pleated panels.



That honeycomb structure was formed from U-shaped strips as taught in Colson's United States Patent No. 4,450,027 by a process of winding the foldable material around a base apparatus, applying glue to one face of the material and adhering each layer to the adjacent layer. This method tends to cause the tab to wrinkle because the stack is wrapped on a slightly curved mandrel. Also, because the material layers are wound in a stack, the length of the panels of final product are limited to the height of the wrapped stack and the ends of the stack are wasted.

Another method for making cellular shades is disclosed in United States Patents 5,015,317; 5,106,444 and 5,193,601 to Corey et al. In that process fabric material is run through a production line that first screen prints the fabric and then applies thermoplastic glue lines at selected intervals. The fabric is then pleated, stacked, and placed in an oven to both set the pleats and bond the material at the glue lines.

There is a need for a method to utilize the current transverse processing equipment technology to make a larger variety of single and multi-layer panels at a faster rate.

### **SUMMARY OF THE INVENTION**

The present method overcomes the problems and achieves the objectives indicated above by providing a method of manufacturing a pleated shade or a honeycomb structure by a means of splitting honeycomb or multicellular material into two or more tabbed, pleated panels or tabbed, cellular panels.

According to the teachings of the present invention, a stack of folded fabric is bonded to form a honeycomb structure having a series of cells connected together along bond lines. An interface region is present between adjacent cells which forms the bridge between horizontally adjacent stacks of cells. At least one bond line applied between adjacent fabric

walls defines each interface region. These interface regions are split to form separate tabbed, pleated panels or separate panels of cells having tabs on one face between each pair of pleats. These tabs extending between each pleated panel or between individual cells, as the case may be, extend at least 1/16" in length. To simplify handling and to create a uniform appearance the tabs are identical in size resulting from a straight-line split along a distinct perpendicular plane, but the invention is not limited to this.

The tabbed cellular material is attached between a headrail and a bottomrail to form a window covering. Lift cords are routed from the bottomrail, through the cellular material and through the headrail for raising and lowering the window covering.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figures 1 and 2 are diagrams showing how the honeycomb stack is formed.

Figure 3 is a diagram showing a triple cell honeycomb stack being split into two tabbed honeycomb panels according to the teachings of the present invention.

Figure 4 is a diagram showing a double cell honeycomb stack being split into tabbed panels.

Figure 5 is a diagram of a five cell honeycomb stack being split into two double honeycomb panels having tabs which are formed on one face of both panels.

Figure 6 is a side view of a window covering made from tabbed, single cell material.

Figure 7 is a side view of similar to Figure 6 showing the lower portion of a window covering made from prismatic or D-shaped, tabbed, single cell material.

Figure 8 is a side sectional view of another D-shaped, tabbed, single cell material.

Figure 9 is a side sectional view of two tabbed cells showing attachment of adjacent cells by a single strip of adhesive.

Figure 10 is a side sectional view of two tabbed cells showing attachment of adjacent cells by several lines or beads of adhesive and a preferred location of a lift cord shown in dotted line.

### **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to Figures 1 and 2, I provide a sheet of pleated fabric 2 which is folded on work surface 1 to form a fabric stack 10. Pleated fabric 2 is delivered to the work surface by a sprocket or other feed mechanism 12 which draws the fabric from a source of supply which is not shown. Glue applicators 14 and 16 apply bond lines 18 of hot melt glue on a surface 4 of the fabric. When the fabric is in the position shown in Figure 1 surface 4 is facing upward. After the fabric has been laid from right to left across the length of stack 10, the fabric is folded as shown in Figure 2. The movement of the stack relative to the fabric being supplied folds the fabric 2 back over the stack forming a pleat 8. Now surface 4 is facing down and opposite surface 6 is facing up. In that position glue applicator 16 applies lines of glue on surface 6. The fabric is laid across the stack from left to right. The process is repeated until a complete stack of fabric 10 has been created. That stack will then have sets of bond lines in vertical planes transverse to the pleat faces. Then, the stack is placed in an oven to melt the glue and bond the pairs of opposing faces together. If desired, irons could be provided to press the pleats after a selected number of passes. Although I prefer to create bond lines using an adhesive, particularly a hot melt adhesive, it is also possible to create the bond lines using a heat welder. After each pair of

opposed pleat faces is laid they are welded together. I have found that a heat welder will bond two overlying sheets without affecting a third sheet below the sheets which are bonded.

In Figures 1 and 2 I show the adhesive lines being applied to pleated fabric. If desired, one can apply the adhesive to the fabric first and then pleat the fabric.

Referring now to Figure 3, a splitter 20 is positioned above the stack so that blades 21 and 23 are positioned directly above adjacent glue lines 18a and 18b. Splitter 20 is then moved through the stack thereby cutting the stack along the glue lines. These cuts form two single cell honeycomb panels 24 and 26. Preferably, the knife cuts between two planes of glue lines A and B so that after cutting the set of glue lines 18a in plane A are in one panel 24 and the set of glue lines 18b in plane B are in a second panel 26. Alternatively, the knife could cut through a plane of glue lines so that a portion of each glue line is in each panel. Each cell 30 has four primary side walls 31, 32, 33 and 34 and two parallel walls to which adjacent cells are attached forming a six-sided polygon shown in Figure 3. Because of the method of manufacture a tab 28 has been formed between adjacent pleat faces or cell sidewalls 32 and 33 and contrast opposite side walls 33 and 34 meet to form a standard pleat, fold or crease. Adjacent cells are connected together by glue lines 18c and 18d at attachment zones, or interconnection zones as shown by Figure 3. I prefer to provide a standard pleat face of 1/2" with a 1/4" bridge formed by glue lines 18c and 18d. Preferably the tab has a width of 1/16" creating an overall width of 5/16". The region between glue lines 18a and 18b is preferably 1/8". Thus, the width of stack 10 would be 2 3/4" to make two panels of this preferred fabric size. Other standard sizes of pleat faces ranging from 1/4" to about 1" can easily be made with this process. Indeed, the pleats can be any desired size.

I prefer that cutter 20 have two outside knives 21 and 23 and one inside knife as shown in Figure 3. The use of two outside knives allows for a better cutting of the glue lines and for a greater tolerance for error of a glue plane placement and thickness. The center knife cuts the accordion pleat remnant in half so that the resulting smaller strips can easily be drawn off by vacuum.

Figure 4 shows a double cell honeycomb stack 30 being split. The cells are formed by sets of glue lines 18a and 18b in planes A and B. The double cells are split by knives 21 and 23 along a perpendicular plane through the glue lines. This method forms two panels of pleated material 32 and 34 each having a joint tab 28 on one face between each pair of adjacent pleat faces 36 and 38. The joint tabs 28 extending between each pair of pleats preferably should measure at least 1/16" in length.

Figure 5 is a diagram of a five-cell honeycomb stack 40 being split. The five-cell honeycomb stack is split along a cutting plane parallel to the planes A and B containing glue lines 18a and 18b. This method forms two panels 42 and 44 of double cell honeycomb material having tabs 28 on one face. The splitter shown in Figure 5, generally designated as 20, is comprised of a center blade 22 which pierces the stack 40 and two blades 21 and 23 that cut the interior edge of each alternating adhesive bond lines 18a and 18b.

Although I have shown the tabs being formed from a single glue line, tab 28 may be formed by either means of a single or a double bond or line of adhesive sometimes called an adhesive strip or glue bead depending upon how the glue is applied. The joint tabs in the separated panels in the figures are the same size. However, this is not necessary. Also, I have shown the glue lines extending to the ends of the tabs. But, this is not necessary.

A major advantage of the present method over the prior art is the gluing machine can make two, tabbed, pleated layers; two, tabbed, single-cells; or two tabbed, double-cell layers by changing the pump pressure and the orifice configuration on the glue heads. Such a change can be made in less than hour. Since the splitter is much faster and simpler than the gluing process, it is a less expensive machine and can handle the output of 3 or 4 gluing machines.

The stack of the present invention can be formed on several types of prior art pleating machines modified to have glue heads and to fold the fabric into the stack after gluing, or by simply modifying the glue heads on machines which have them to place more glue lines at different intervals. Such modified machines should be able to put out nearly twice the effective output than they did prior to modification.

As shown in Figure 6, a tabbed, cellular panel 26 is attached between a headrail 50 and bottomrail 52. The uppermost cell is attached to the headrail. An insert or slat 56 fits through the lowermost cell and that assembly is attached to the main housing 57 of the bottomrail 52. Lift cords or pullcords 51 extend from the bottomrail 52, also called the lower rail assembly through the cellular material 26 and into the headrail 50, also called the upper rail assembly. The lift cords may pass through a cord lock 53 and the front face of the headrail as shown or may be attached to a tube lift (not shown). Typically, at least two lift cords are used for each window covering. Each lift cord 51 passes through the centerline of the cells with the glue lines 76 being approximately equidistant from that centerline. The glue lines extend the full width of the cellular material and define the front and rear limits or edges of the interconnection zones or the middle sides of the six-sided cells. Adjacent cells may be attached by a single strip of adhesive 76 as shown in Figure 9 or by several glue lines 76 as shown in Figure 10. I prefer to provide at least two spaced apart glue lines forming at least two spaced apart attachment zones so

that the lift cord may pass through holes cut between them as shown in Figures 6 and 10. With that arrangement drilling the cord holes is much easier. The hollow drill bit is less likely to become clogged and the glue lines act as guides to direct the drill bit through the fabric between them.

The cells may be symmetrical like those shown in Figure 6 or nonsymmetrical. In the embodiment shown in Figure 7, the cells have a prismatic shape or D-shape. The interior angle defined between the front upper side 33 and the front lower side 34 is less than the interior angle between the rear upper side 32 and the rear lower side 31. In the symmetrical cells shown in Figure 6, these angles are approximately equal. The symmetrical cells in Figure 6 are connected so that a centerline through interconnection zone 54 will be collinear with a centerline through the cells. However, in the cell shapes of Figures 7 and 8, a centerline through the interconnection zone is rearward or forward of a centerline through the cells. The centerline through the cells is indicated by dotted line A-A in Figures 7 and 8. In all of the cellular structures shown in the drawings, the interconnection zones in each cellular panel are parallel to one another and equal in length. Consequently, the panel will have a uniform appearance from top to bottom when hung.

A variety of fabrics could be used to make the cellular structure. However, the industry has tended to use less expensive, non-woven fabrics made from synthetic materials, particularly polyester fabrics. Those skilled in the art will also recognize that several different adhesives could be used. One suitable adhesive is moisture cured cross-linking polyurethane adhesive. One could also use a hot-melt thermoplastic polyester UV-stabilized adhesive.

Even though I prefer to make the tabbed cellular structure in the manner illustrated and described here, other techniques could be used. Sonic welding could be used

rather than adhesives. The stack could be constructed and cut to create only one cellular structure and fabric pieces rather than two panels of fabric. Strips of a hot melt glue could be applied to the fabric before the fabric is folded to form the stack.

Although I have shown certain present preferred embodiments of my method and the pleated and honeycomb structures made therefrom, it should be distinctly understood that my invention is not limited thereto, but may be variously embodied within the scope of the following claims.

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I claim:

1. A cellular pleated shade member having a plurality of cells, at least one of the cells comprising:

a strip of shade material folded lengthwise to form an upper cell wall and a lower cell wall extending from a fold, each upper and lower cell wall having a free edge and a folded edge merging with the adjacent wall of the strip at said fold;

said upper cell wall and lower cell wall of said strip connected adjacent their respective free edges and forming a fin at said connection;

wherein said upper cell wall is attached to a lower cell wall of a first adjacent cell at an upper interconnection zone, said upper interconnection zone being located on said upper cell wall between said fin and said fold; and

wherein said lower cell wall is attached to an upper cell wall of a second adjacent cell at a lower interconnection zone, said lower interconnection zone being located on said lower cell wall between said fin and said fold.

2. The cellular pleated shade according to claim 1, wherein said upper cell wall includes a centerline midway between said free edges and said fold and said upper cell wall is attached to said first adjacent cell along said centerline.

3. The cellular pleated shade according to claim 1, wherein said upper cell wall includes a centerline midway between said free edges and said fold and said upper cell wall is attached to said first adjacent cell between said centerline and said fold.

4. The cellular pleated shade according to claim 1, wherein said upper cell wall includes a centerline midway between said free edges and said fold and said upper cell wall is attached to said first adjacent cell between said centerline and said fin.

5. The cellular pleated shade of claim 1, wherein said upper interconnection zone has two side terminations, said side terminations being on opposite sides of said longitudinal centerline of said upper cell wall.

6. The cellular pleated shade of claim 1, wherein said free edges of said upper cell wall and lower cell wall are connected by sonic welding.

7. The cellular pleated shade of claim 1, wherein said free edges of said upper cell wall and lower cell wall are connected by an adhesive glue.

8. The cellular pleated shade of claim 5, further comprising a pullcord disposed through said plurality of cells and through said upper and lower interconnection zones.

9. The cellular pleated shade of claim 2, wherein said lower cell wall is attached to said second adjacent cell by means a glue bead.

10. The cellular pleated shade of claim 2, wherein said lower cell wall is attached to said second adjacent cell by means of an adhesive strip.

11. A cellular shade, having a plurality of interconnected fabric cells for covering a window, at least one of the cells comprising:

a strip of nonwoven fabric shade material folded at a tip to form an upper cell wall and a lower cell wall, said upper cell wall extending from said tip and having a rear edge and said lower cell wall extending from said tip and having a rear edge;

a fin, wherein said fin is formed by joining a portion of said upper cell wall adjacent said rear edge of said upper cell wall with a portion of said lower cell wall adjacent said rear edge of said lower cell wall;

means for attaching said upper cell wall of said cell to a lower cell wall of a first adjacent cell; and

means for attaching said lower cell wall of said cell to an upper cell wall of a second adjacent cell.

12. A cellular shade for covering a window, said shade comprising:

a plurality of interconnected fabric cells, wherein each cell has:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said crease and having a rear edge, said upper cell wall having a longitudinal centerline equidistant along said upper cell wall from said crease and from said rear edge of said upper cell wall;

a lower cell wall extending from said crease and having a rear edge, said lower cell wall and said upper cell wall being substantially equal in length;

a fin on said rear side, wherein said fin is formed by joining a portion of said upper cell wall adjacent said rear edge of said upper cell wall with a portion of said lower cell wall adjacent said rear edge of said lower cell wall; and

material located on at least one of said upper cell wall and said lower cell wall for attaching said each cell of said plurality of cells to an adjacent cell of said plurality of cells;

wherein substantially all cells of said plurality of cells have for each cell an interconnection zone on said upper cell wall, said interconnection zone defined by said material when said material is located on said upper cell wall; and

wherein said interconnection zone has an interconnection centerline.

13. The cellular shade of claim 12, wherein the location of said interconnection centerline is forward of said longitudinal centerline.

14. The cellular shade of claim 13, wherein said material is a high temperature, hot-melt thermoplastic polyester UV-stabilized adhesive.

15. The cellular shade of claim 13, wherein said material is an adhesive strip.

16. The cellular shade of claim 13, wherein the fabric of said interconnected fabric cells is a nonwoven fabric.

17. The cellular shade of claim 13, wherein the fabric of said interconnected fabric cells is polyester.

18. A cellular shade for covering a window, said shade comprising:

a plurality of interconnected fabric cells, wherein substantially all cells within said plurality of cells have for each cell:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said tip and having a rear edge, said upper cell wall having an upper surface and an interior surface and having a longitudinal centerline equidistant along said upper cell wall from said tip and from said rear edge of said upper cell wall,

a lower cell wall extending from said tip and having a rear edge, said lower cell wall having a lower surface and an interior surface, said lower cell wall and said upper cell wall being substantially equal in length;

a fin on said rear side, wherein said fin is formed by joining a portion of said upper cell wall adjacent said rear edge of said upper cell wall with a portion of said lower cell wall adjacent said rear edge of said lower cell wall;

an adhesive on said upper cell wall, said adhesive for connecting said each cell to an adjacent cell of said plurality of cells; and

an interconnection zone defined by said adhesive,

wherein said interconnection zone has an interconnection centerline and said I interconnection centerline is forward of said longitudinal centerline;

wherein when said cellular shade is extended, a portion of the interior surface of said upper cell wall and a portion of the interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper rear side, an

upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side; and

wherein said fin, said upper middle side and said lower middle side are substantially in parallel arrangement.

19. The cellular shade of claim 18, wherein an interior angle defined by said upper front side and said lower front side is approximately equal to an interior angle defined by said upper rear side and said lower rear side.

20. The cellular shade of claim 19, wherein said adhesive includes a plurality of glue beads.

21. The cellular shade of claim 20, wherein said glue beads extend longitudinally along said upper surface of said upper cell wall of said cell.

22. The cellular shade of claim 21, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by glue.

23. The cellular shade of claim 21, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by an adhesive strip.

24. The cellular shade of claim 21, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by sonic welding.

25. A cellular shade for covering a window, said shade comprising:

a plurality of interconnected fabric cells, wherein each cell within said plurality of cells is comprised of a nonwoven fabric and has:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said tip and having a rear edge, said upper cell wall having an upper surface and an interior surface and having a longitudinal centerline equidistant along said upper cell wall from said tip and from said rear edge of said upper cell wall;

a lower cell wall extending from said tip and having a rear edge, said lower cell wall having a lower surface and an interior surface, said lower cell wall and said upper cell wall being substantially equal in length; and

a fin on said rear side, wherein said fin is formed by joining a first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall with a first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall;

a high temperature adhesive on substantially all cells of said plurality of cells, said high temperature adhesive for connecting each cell of said substantially all cells to an adjacent cell of said plurality of cells;

an upper rail assembly, said upper rail assembly attached to an uppermost cell of said plurality of cells;

a lower rail assembly, said lower rail assembly attached to a lowermost cell of said plurality of cells; and

a pullcord, said pullcord for raising and lowering one of said upper and lower rail assembly in relation to the other of said upper and lower rail assembly.

26. The cellular shade of claim 25, wherein said high temperature adhesive extends longitudinally along said upper surface of said upper cell wall of said cell.

27. The cellular shade of claim 26, wherein said first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall by a high temperature adhesive.

28. The cellular shade of claim 27, wherein when said cellular shade is extended, a second portion of said interior surface of said upper cell wall and a second portion of said interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side.

29. The cellular shade of claim 28, wherein said fin, said upper middle side and said lower middle side are substantially in parallel arrangement.

30. The cellular shade of claim 28, wherein an interior angle defined by said upper front side and said lower front side is less than an interior angle defined by said upper rear side and said lower rear side.



31. The cellular shade of claim 28, wherein an interior angle defined by said upper front side and said lower front side is approximately equal to an interior angle defined by said upper rear side and said lower rear side.

32. The cellular shade of claim 29, wherein said upper middle side is approximately equal in length to said lower middle side.

33. The cellular shade of claim 32, wherein said high temperature adhesive on substantially all cells of said plurality of cells is on said upper surface of said upper cell wall of each cell of said substantially all cells and defines an interconnection zone for each cell of said substantially all cells, said interconnection zone having an interconnection centerline, and wherein said interconnection centerline is located forward of said longitudinal centerline on said upper surface.

34. A cellular shade for covering a window, said shade comprising:  
a plurality of interconnected nonwoven fabric cells, wherein substantially all cells within said plurality of cells have for each cell:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said tip and having a rear edge, said upper cell wall having an upper surface and an interior surface and having a longitudinal centerline equidistant along said upper cell wall from said tip and from said rear edge of said upper cell wall;

a lower cell wall extending from said tip and having a rear edge, said lower cell wall having a lower surface and an interior surface;

a fin on said rear side, wherein said fin is formed by joining a first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall with a first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall; and

an interconnection zone on said upper surface, said interconnection zone having an interconnection centerline;

an adhesive on substantially all cells of said plurality of cells, said adhesive for connecting each cell of said substantially all cells to an adjacent cell of said plurality of cells, wherein said adhesive includes a first high temperature glue bead on said upper surface of said upper cell wall and a second high temperature glue bead on said upper surface of said upper cell wall, said first and said second high temperature glue beads being on opposite sides of said longitudinal center line of said upper cell wall, said first and said second high temperature glue beads extending longitudinally along said upper surface of said upper cell wall;

an upper rail assembly, said upper rail assembly attached to an uppermost cell of said plurality of cells;

a lower rail assembly, said lower rail assembly attached to a lowermost cell of said plurality of cells;

a pullcord, said pullcord for raising and lowering said one of said upper and lower rail assembly in relation to the other of said upper and lower rail assembly;

wherein when said cellular shade is extended:

a second portion of said interior surface of said upper cell wall and a second portion of said interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side;

the length of said upper middle side and said lower middle side are of approximately equal lengths, the length of said upper middle side being less than the length of either of said upper rear side and said upper front side, and the length of said lower middle side being less than the length of either of said lower rear side and said lower front side; and

said fin, said upper middle side and said lower middle side are in substantially parallel arrangement; and

wherein said interconnection centerline is forward of said longitudinal centerline on said upper surface.

35. A cellular pleated shade member having a plurality of interconnected cells, at least one of the cells comprising:

a strip of shade material folded lengthwise to form an upper cell wall and a lower cell wall extending from a fold, each upper and lower cell wall having a free edge and a folded edge;

said upper cell wall and lower cell wall of said strip interconnected adjacent their respective free edges; and

said upper cell wall and said lower cell wall each having at least one attachment zone on each side of a longitudinal center line of each said cell wall for connecting said cell to an adjacent cell.

36. The cellular pleated shade of claim 35, wherein one of said upper cell wall and lower cell wall includes two attachment zones that extend longitudinally thereon.

37. The cellular pleated shade of claim 35, wherein said free edges of said upper cell wall and lower cell wall are interconnected by sonic welding.

38. The cellular pleated shade of claim 35, wherein said free edges of said upper cell wall and lower cell wall are interconnected by an adhesive glue.

39. The cellular pleated shade of claim 35, wherein said free edges of said upper cell wall and lower cell wall are interconnected by an adhesive strip.

40. The cellular pleated shade of claim 36, further including a pullcord disposed through the pleats of said cellular pleated shade between said two attachment zones.

41. The cellular pleated shade of claim 35, wherein said cell is connected to said adjacent cell at said attachment zones.

42. The cellular pleated shade of claim 41, wherein a glue bead connects said cell to said adjacent cell at each said attachment zone.

43. The cellular pleated shade of claim 41, wherein an adhesive strip connects said cell to said adjacent cell at each said attachment zone.

44. A cellular shade for covering a window, said shade comprising:  
a plurality of longitudinally extending, substantially parallel interconnected fabric cells, wherein substantially all cells within said plurality of cells have for each cell:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said crease and having a rear edge, said upper cell wall having a longitudinal center line equidistant along said upper cell wall from said crease and from said rear edge of said upper cell wall;

a lower cell wall extending from said crease and having a rear edge, said lower cell wall and said upper cell wall being substantially equal in length;  
and

a fin on said rear side, wherein said fin is formed by joining a portion of said upper cell wall adjacent said rear edge of said upper cell wall with a portion of said lower cell wall adjacent said rear edge of said lower cell wall; and

material located on at least one of said upper cell wall and said lower cell wall for attaching each cell of said plurality of cells to an adjacent cell of said plurality of cells.

45. The cellular shade of claim 44, wherein said material for attaching includes an adhesive strip.

46. The cellular shade of claim 45, wherein said adhesive strip passes through said longitudinal center line of said upper cell wall.

47. The cellular shade of claim 44, wherein said material for attaching includes at least one glue bead.

48. The cellular shade of claim 47, wherein said at least one glue bead passes through said longitudinal center line of said upper cell wall.

49. The cellular shade of claim 44, wherein said material for attaching includes a glue bead on each side of said longitudinal center line of said upper cell wall.

50. The cellular shade of claim 49, wherein said glue beads are approximately equidistant along said upper cell wall from said longitudinal center line of said upper cell wall.

51. The cellular shade of claim 44, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by a glue bead.

52. The cellular shade of claim 44, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by an adhesive strip.

53. The cellular shade of claim 44, wherein said portion of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said portion of said lower cell wall adjacent said rear edge of said lower cell wall by sonic welding.

54. The cellular shade of claim 44, wherein when said cellular shade is extended, the interior surfaces of said upper cell wall and said lower cell wall define a six-sided polygon, said six-sided polygon having an upper rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side.

55. The cellular shade of claim 54, wherein said fin, said upper middle side and said lower middle side are substantially in parallel arrangement.

56. The cellular shade of claim 54, wherein an interior angle defined by said upper front side and said lower front side is less than an interior angle defined by said upper rear side and said lower rear side.

57. The cellular shade of claim 54, wherein said upper middle side is approximately equal in length to said lower middle side.

58. A cellular shade for covering a window, said shade comprising:  
a plurality of longitudinally extending interconnected fabric cells, wherein each cell within said plurality of cells has:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said tip and having a rear edge, said

upper cell wall having an upper surface and an interior surface and having

a longitudinal center line equidistant along said upper cell wall from said tip and from said rear edge of said upper cell wall;

a lower cell wall extending from said tip and having a rear edge, said lower cell wall having a lower surface and an interior surface, said lower cell wall and said upper cell wall being substantially equal in length; and

a fin on said rear side, wherein said fin is formed by joining a first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall with a first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall;

an adhesive on substantially all cells of said plurality of cells, said adhesive for connecting each cell of said substantially all cells to an adjacent cell of said plurality of cells;

an upper rail assembly, said upper rail assembly attached to an uppermost cell of said plurality of cells;

a lower rail assembly, said lower rail assembly attached to a lowermost cell of said plurality of cells; and

a pullcord, said pullcord for raising and lowering one of said upper and lower rail assembly in relation to the other of said upper and lower rail assembly.

59. The cellular shade of claim 58, wherein said adhesive includes an adhesive strip on said upper surface of said upper wall.



60. The cellular shade claim 59, wherein said adhesive strip passes through said longitudinal center line of said upper cell wall.

61. The cellular shade of claim 58, wherein said adhesive includes an adhesive strip on said lower surface of said lower cell wall.

62. The cellular shade of claim 58, wherein said adhesive includes a glue bead on said upper surface of said upper cell wall.

63. The cellular shade of claim 62, wherein said glue bead passes through said longitudinal center line of said upper cell wall.

64. The cellular shade of claim 58, wherein said adhesive includes a first glue bead on said upper surface of said upper cell wall and a second glue bead on said upper surface of said upper cell wall, said first and said second glue beads being on opposite sides of said longitudinal center line of said upper cell wall.

65. The cellular shade of claim 64, wherein said first and said second glue beads extend longitudinally along said upper surface of said upper cell wall of said cell.

66. The cellular shade of claim 65, wherein said first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall by an adhesive.

67. The cellular shade of claim 66, wherein when said cellular shade is extended, a second portion of said interior surface of said upper cell wall and a second portion of said interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper

rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side.

68. The cellular shade of claim 67, wherein said fin, said upper middle side and said lower middle side are substantially in parallel arrangement.

69. The cellular shade of claim 67, wherein an interior angle defined by said upper front side and said lower front side is less than an interior angle defined by said upper rear side and said lower rear side.

70. The cellular shade of claim 69, wherein said first and said second glue beads are approximately equidistant along said upper cell wall from said longitudinal center line of said upper cell wall.

71. The cellular shade of claim 70, wherein said first glue bead is proximate to a front end of said upper middle side and said second glue bead is proximate to a rear end of said upper middle side.

72. The cellular shade of claim 71, wherein said upper middle side is approximately equal in length to said lower middle side.

73. The cellular shade of claim 58, wherein said adhesive includes a first glue bead on said lower surface of said lower cell wall and a second glue bead on said lower surface of said lower cell wall.

74. The cellular shade of claim 73, wherein when said cellular shade is extended, a second portion of said interior surface of said upper cell wall and a second portion of said interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper

rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side.

75. The cellular shade of claim 74, wherein said fin, said upper middle side and said lower middle side are substantially in parallel arrangement.

76. The cellular shade of claim 73, wherein an interior angle defined by said upper front side and said lower front side is less than an interior angle defined by said upper rear side and said lower rear side.

77. The cellular shade of claim 73, wherein said upper middle side is approximately equal in length to said lower middle side.

78. The cellular shade of claim 77, wherein said first glue bead is proximate to a front end of said lower middle side and said second glue beads is proximate to a rear end of said lower middle side.

79. The cellular shade of claim 78, wherein said first and said second glue beads extend longitudinally along said lower surface of said lower cell wall of said cell.

80. The cellular shade of claim 79 wherein said first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall is joined with said first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall by an adhesive.

81. A cellular shade for covering a window, said shade comprising:  
a plurality of longitudinally extending interconnected fabric cells, wherein  
substantially all cells within said plurality of cells have for each cell:

a front side and a rear side;

a crease forming a tip on said front side;

an upper cell wall extending from said tip and having a rear edge, said upper cell wall having an upper surface and an interior surface and having a longitudinal center line equidistant along said upper cell wall from said tip and from said rear edge of said upper cell wall;

a lower cell wall extending from said tip and having a rear edge, said lower cell wall having a lower surface and an interior surface; and

a fin on said rear side, wherein said fin is formed by joining a first portion of said interior surface of said upper cell wall adjacent said rear edge of said upper cell wall with a first portion of said interior surface of said lower cell wall adjacent said rear edge of said lower cell wall;

an adhesive on substantially all cells of said plurality of cells, said adhesive for connecting each cell of said substantially all cells to an adjacent cell of said plurality of cells, wherein said adhesive includes a first glue bead on said upper surface of said upper cell wall and a second glue bead on said upper surface of said upper cell wall, said first and said second glue beads being on opposite sides of said longitudinal center line of said upper cell wall, said first and said second glue beads extending longitudinally along said upper surface of said upper cell wall;

an upper rail assembly, said upper rail assembly attached to an uppermost cell of said plurality of cells;

a lower rail assembly, said lower rail assembly attached to a lowermost cell of said plurality of cells; and

a pullcord, said pullcord for raising and lowering said one of said upper and lower a lower rail assembly in relation to the other of said upper and lower rail assembly;

wherein when said cellular shade is extended,

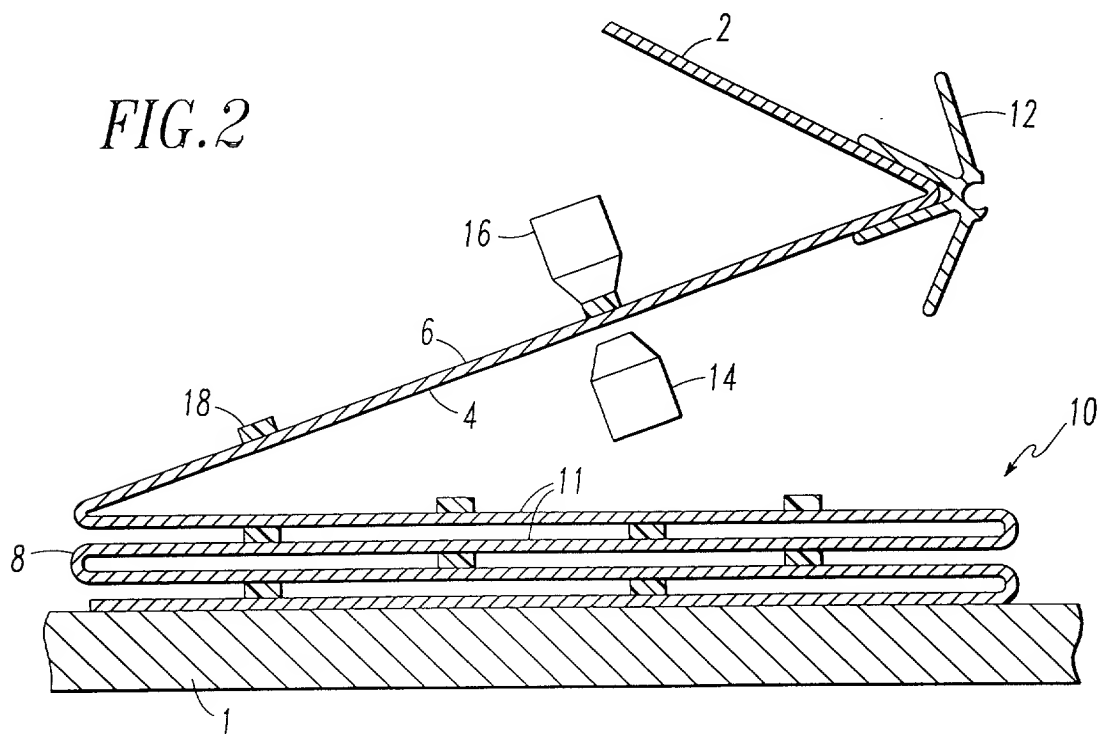
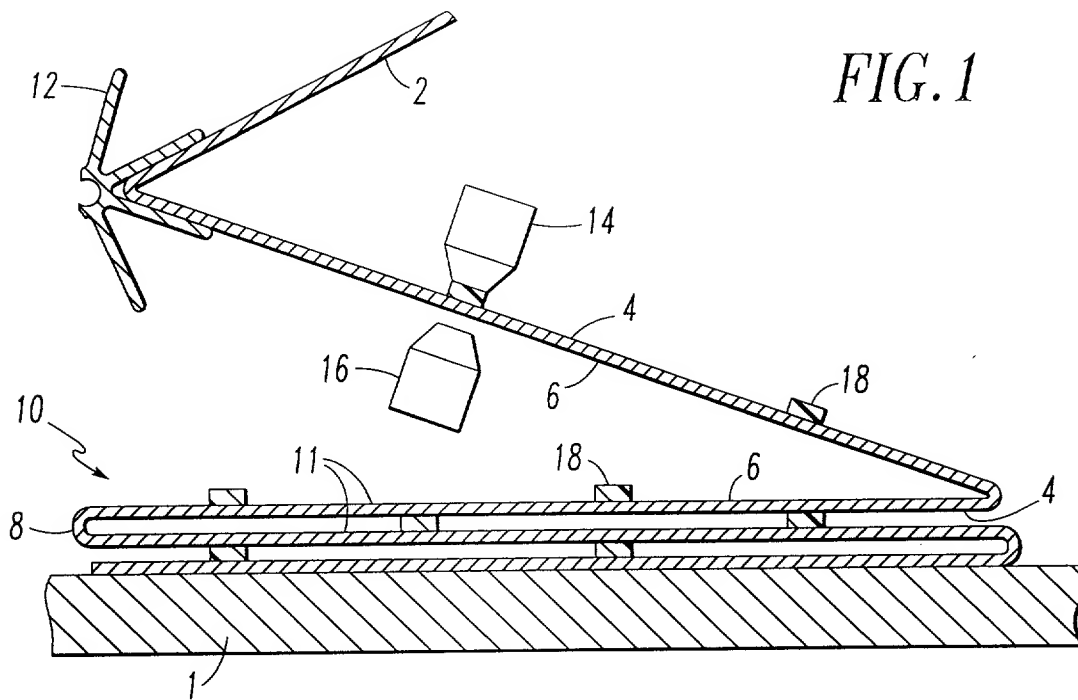
a second portion of said interior surface of said upper cell wall and a second portion of said interior surface of said lower cell wall define a six-sided polygon, said six-sided polygon having an upper rear side, an upper middle side, an upper front side, a lower front side, a lower middle side, and a lower rear side;

the length of said upper middle side and said lower middle side are of approximately equal lengths, the length of said upper middle side being less than the length of either of said upper rear side and said upper front side, and the length of said lower middle side being less than the length of either of said lower rear side and said lower front side; and

said fin, said upper middle side and said lower middle side are in substantially parallel arrangement.

### **ABSTRACT OF THE DISCLOSURE**

A tabbed honeycomb structure or pleated panel is made from a stack of collapsed multi-cellular material. The stack is split at bond lines thereby forming the panels of pleated or honeycomb material having a joint tab on one face. The tabbed, honeycomb material is attached between a headrail and a bottomrail to form a window covering.



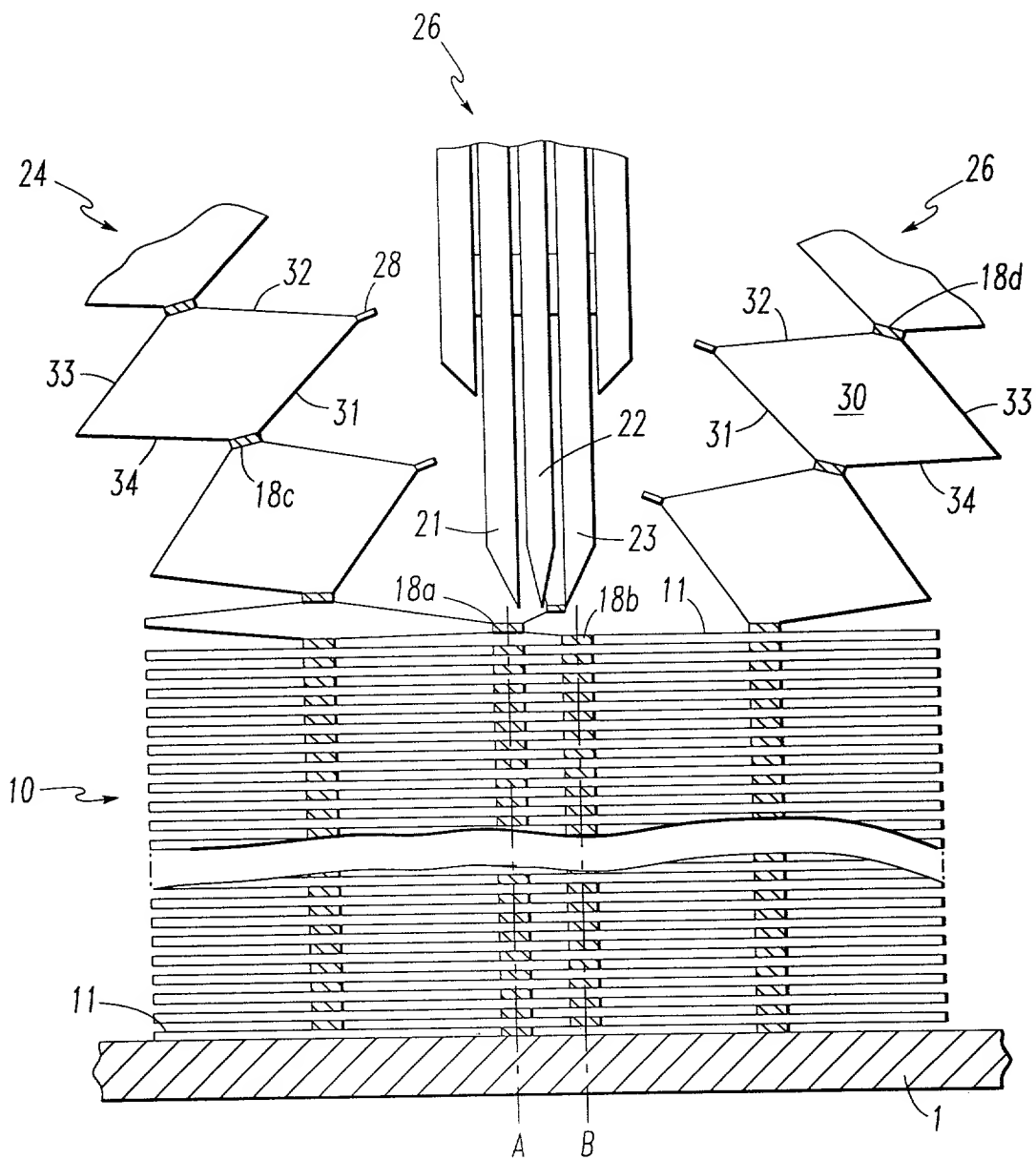


FIG. 3



FIG. 4

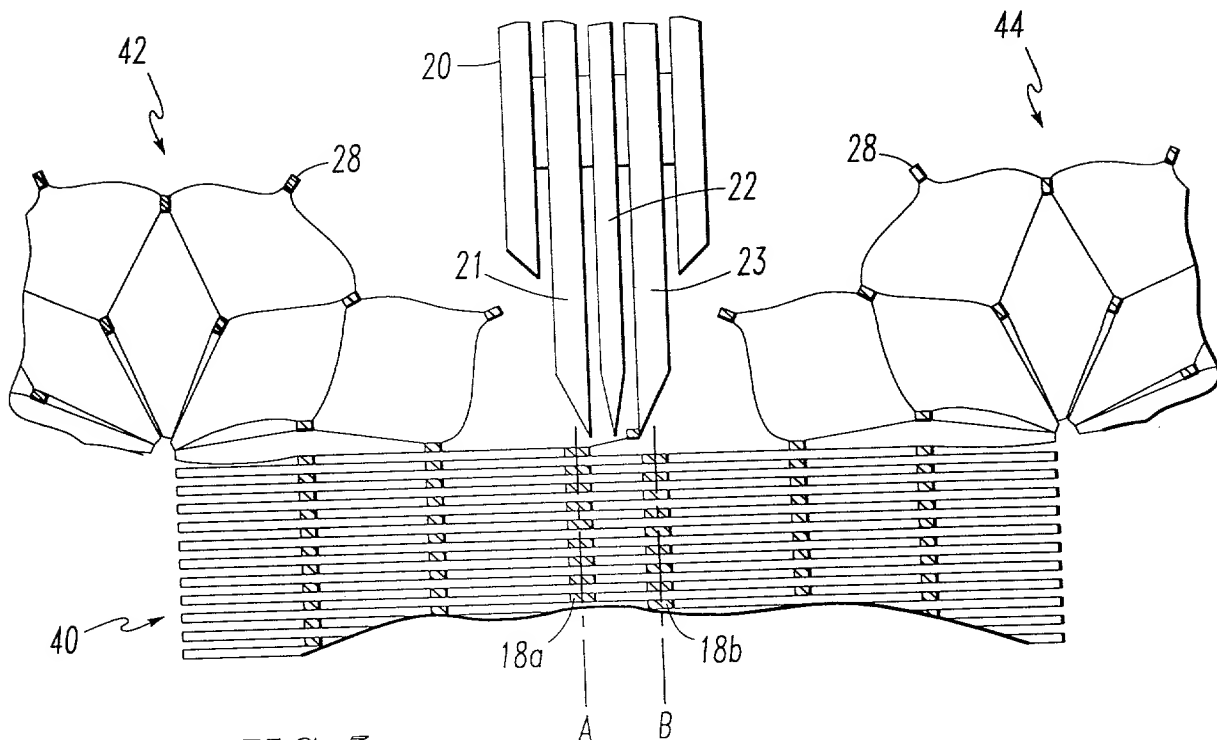
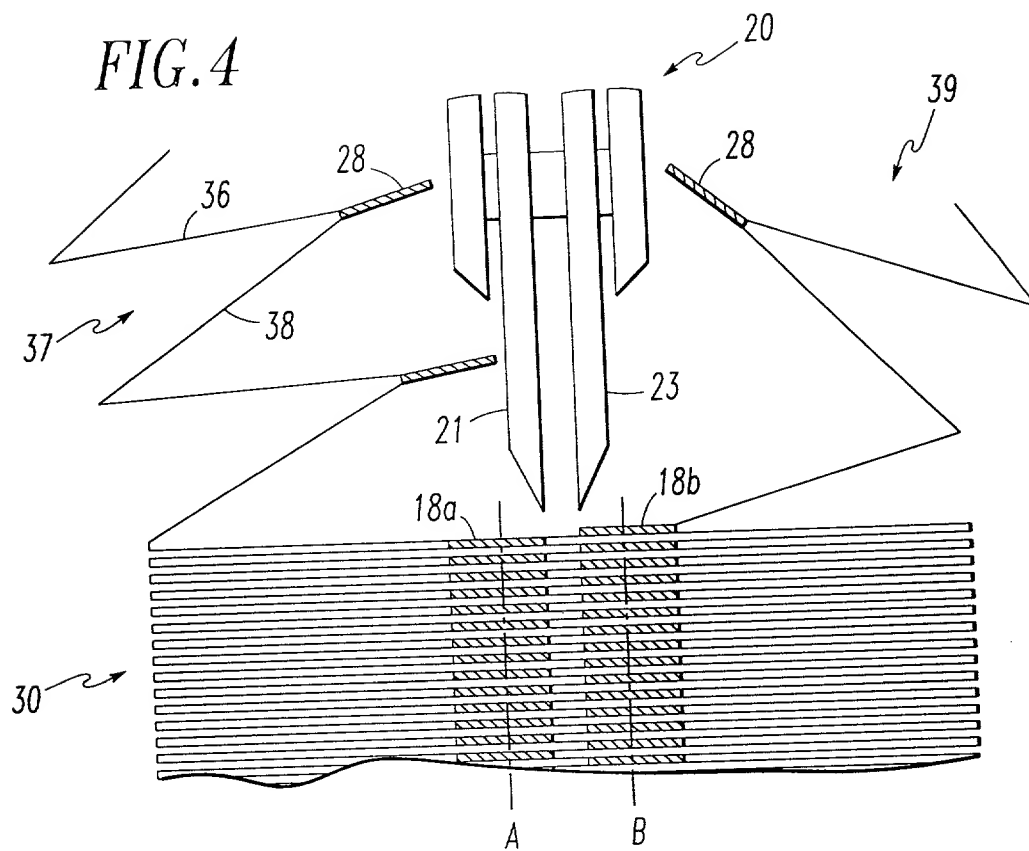


FIG. 5

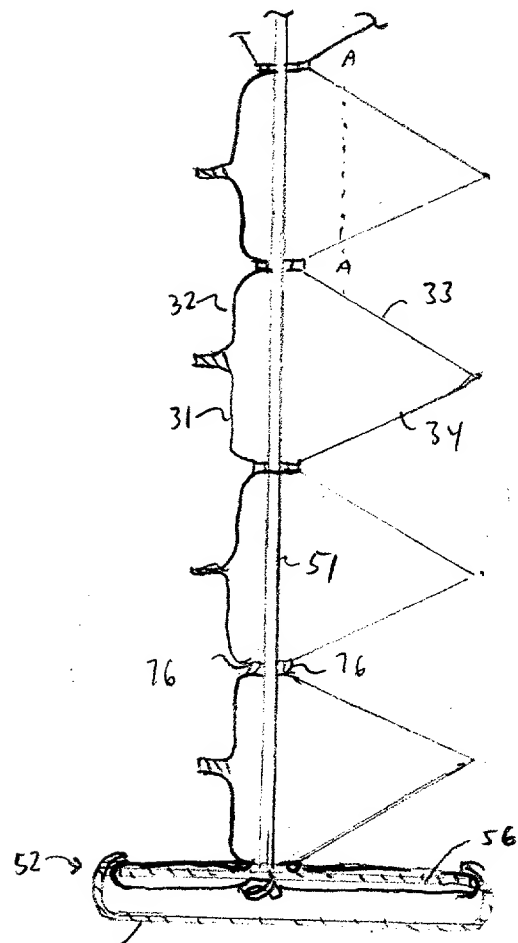
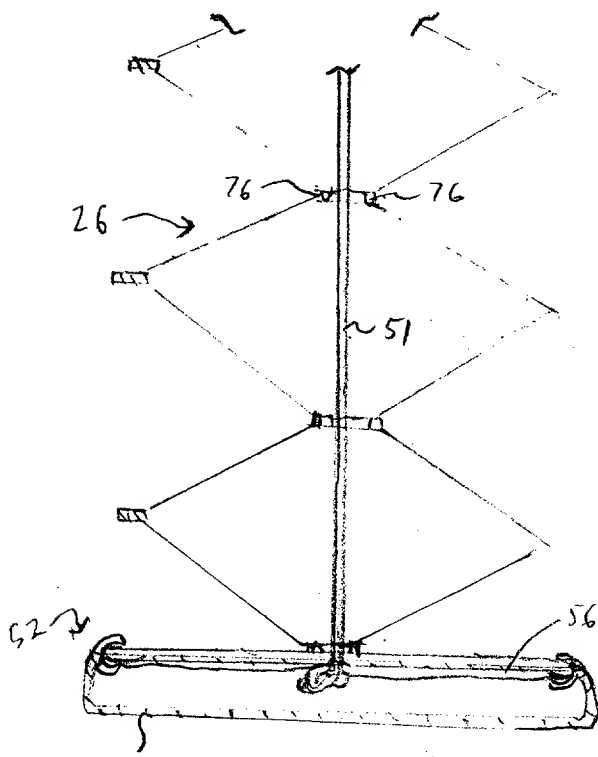
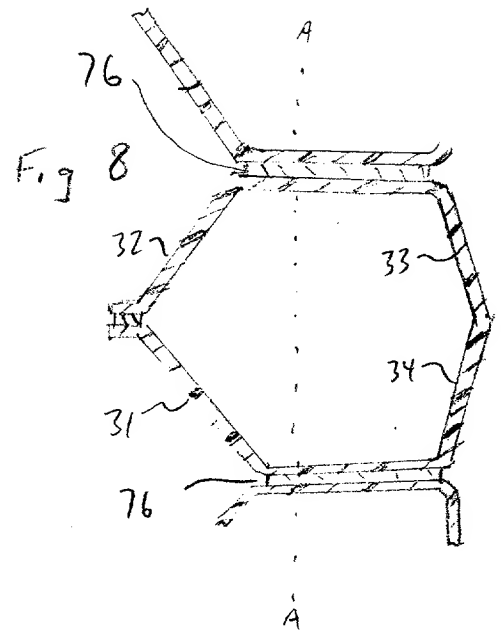
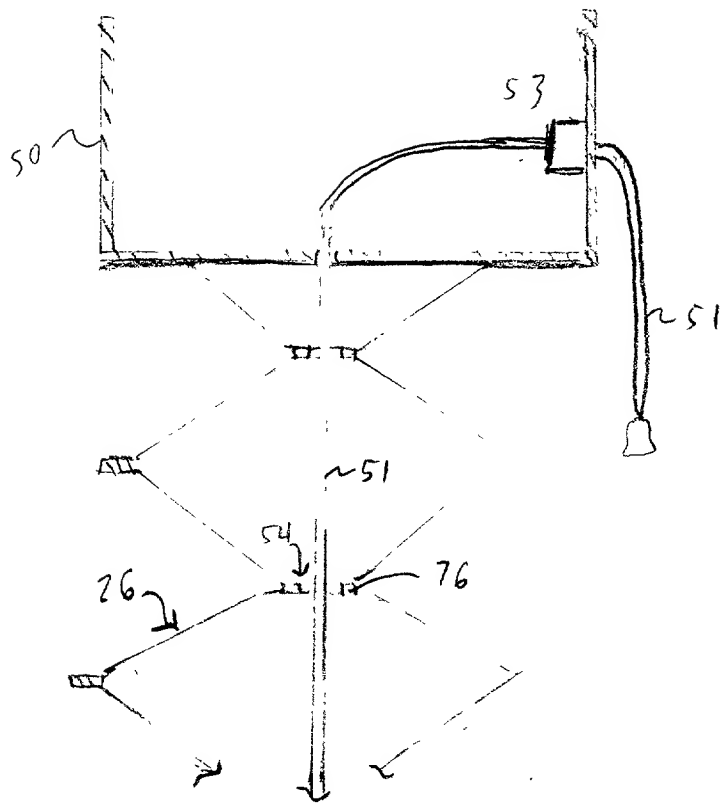
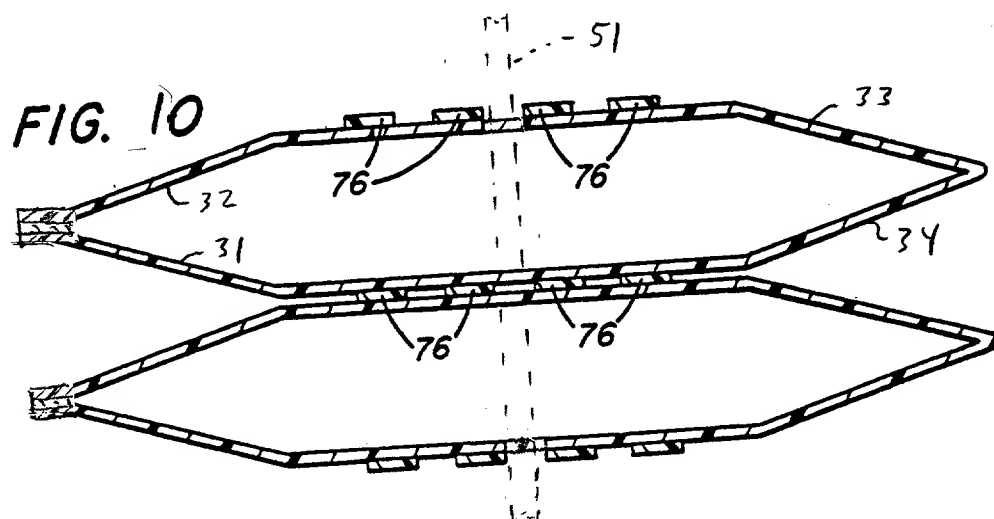
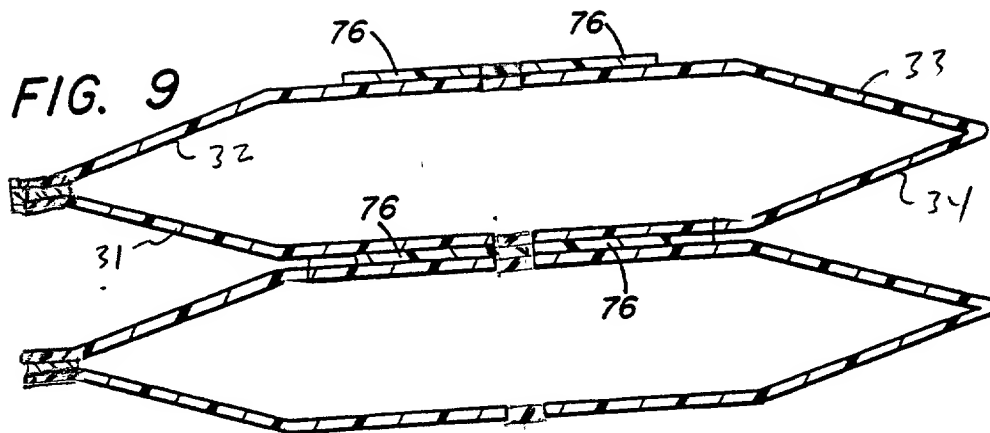


Fig 6

Fig 7



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit 3101 :  
Examiner Blair Johnson :  
In re application of :  
REN JUDKINS : PLEATED AND CELLULAR  
Serial No. 08/756,282 : MATERIALS AND METHOD FOR  
THE MANUFACTURE THEREOF  
Filed November 25, 1996 : USING A SPLITTER

**DECLARATION OF REN JUDKINS UNDER 37 C.F.R. § 1.131**

I, REN JUDKINS, hereby declares as follows:

1. I am the inventor of the subject matter of the above-titled application. At least as early as 1990 I conceived of a tabbed honeycomb material for use in cellular pleated shades. I envisioned that such a shade could be made by splitting double cell or triple cell structure to create one or two stacks of single cell tabbed honeycomb. Each cell of this honeycomb would be made of strips of material folded lengthwise to form an upper cell wall and a lower cell wall. Then, the free edges would be connected together by adhesive or by welding to form a tab or fin. This cellular material would be attached between a headrail and a bottomrail and have lift cords as in other types of pleated shades.

2. Prior to March 1994 I obtained samples of multiple cell material manufactured by at least two different manufacturers. I cut that material to form one or two stacks of single cell material. Each stack consisted of a series of tabbed cells, each cell attached at its upper edge and at its lower edge to its adjacent cells.

3. On February 25, 1991, during the ordinary course of business I created a computer drawing of my tabbed cellular structure. A copy of that drawing labeled T19 is attached hereto. The document number 910225A contains the date 910225 and a letter indicating it was the first drawing done that day.

4. Since originally conceiving of the tabbed cellular structure I have been diligent in testing various fabrics and adhesives, in seeking licensees for this invention and in searching for a machine builder who could manufacture a machine that could make this tabbed cellular structure.

I declare that the foregoing is true and correct, that all statements made on information and belief are believed to true, and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any false statements may jeopardize the validity of a patent which issues from the above-identified patent application.

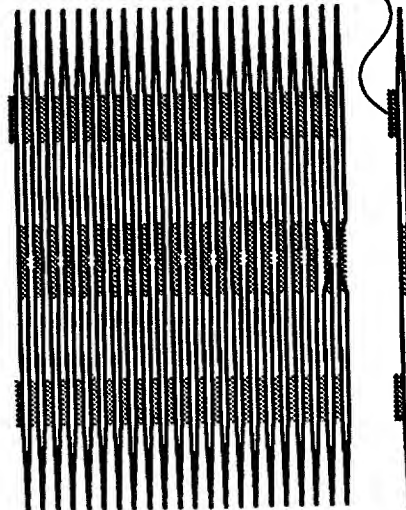
Jan 20, 1998  
Date: \_\_\_\_\_

  
\_\_\_\_\_  
REN JUDKINS

Doc. no. 910225 A

CONFIDENTIAL

The tab on the honeycomb is necessary as an area for the bond line, but it will also create more definition in the appearance of the product. A definite advantage especially on the window side. The tab could also serve as a point to attach another tabbed layer in a more energy conscious market (Finland). The tab needs to be at least 1/16th of an inch wide and can be much wider if needed. Cell sizes could also be much larger. The minimum size is shown.



Tubes are double bonded and stacked

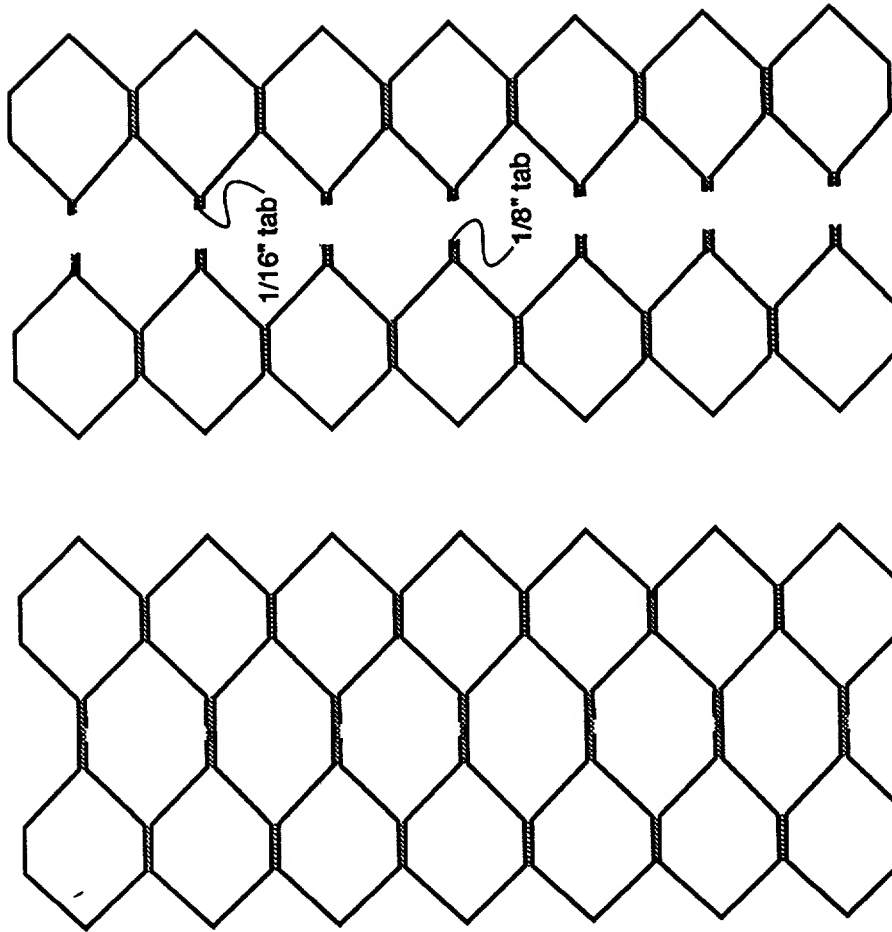


Tube is bonded to itself



Flat strip is folded into tube

**Two Symmetrical Tabbed Honeycombs -**  
made simultaneously by splitting in half a triple cell honeycomb made by the strip process.



Stretched stack forms a triple cell honeycomb which might be practical for some energy conservation products or is split.

Triple cell split into two single cell honeycombs with tabs. The tabs can be any size greater than .06".

Scale: actual size

Ren Judkins & Company

T19

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit 3101 :  
Examiner Blair Johnson :  
In re application of :  
REN JUDKINS : PLEATED AND CELLULAR  
Serial No. 08/756,282 : MATERIALS AND METHOD FOR  
THE MANUFACTURE THEREOF  
Filed November 25, 1996 : USING A SPLITTER

**DECLARATION OF LYNN J. ALSTADT**

I, LYNN J. ALSTADT, hereby declares as follows:

1. I am a patent attorney registered to practice in the United States Patent and Trademark Office. I have represented Ren Judkins either as an individual or as an employee of Verosol USA since 1988. I am familiar with many of the drawings that Mr. Judkins has made of his inventions and of the manner in which he has made these drawings.

2. Shortly after February 25, 1991, and not later than May 30, 1991, Mr. Judkins showed me the drawing labeled T19 attached hereto. I understood that Mr. Judkins made this drawing during the ordinary course of his business on February 25, 1991. The drawing shows a tabbed cell and method of making that tabbed cell using a splitter that Mr. Judkins had conceived.

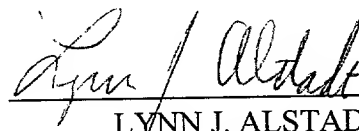
3. Mr. Judkins made a paper model of a tabbed honeycomb while in my office. He folded tablet paper and placed double sided tape between the folds. The resulting stack

looked like the stack shown in drawing T19, but with fewer folds. He or I then cut the stack with a razor blade to form a tabbed honeycomb like that shown in drawing T19. I believe that this occurred on May 30, 1991, and am confident that it occurred prior to July 26, 1991. I discarded the paper model after the meeting.

4. I know that Mr. Judkins has since 1991 been diligently seeking to have his tabbed honeycomb and splitter process commercialized. These efforts have included seeking machine builders who could manufacture a splitter machine, testing adhesives and trying to find a manufacturer of window coverings who would take a license for this product and process.

I declare that the foregoing is true and correct, that all statements made on information and belief are believed to true, and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any false statements may jeopardize the validity of a patent which issues from the above-identified patent application.

Date: January 20, 1998

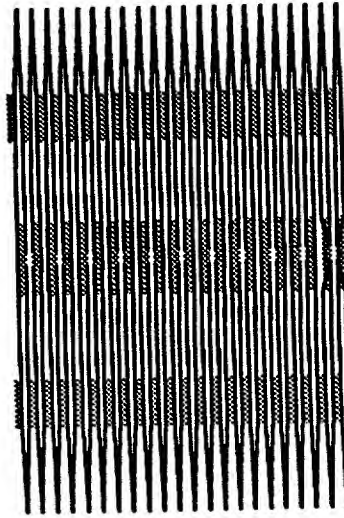
  
LYNN J. ALSTADT



Doc. no. 910225 A

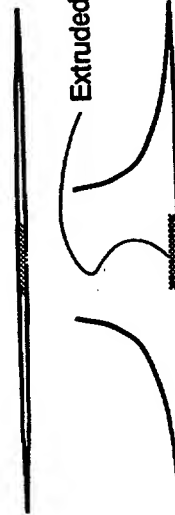
CONFIDENTIAL

The tab on the honeycomb is necessary as an area for the bond line, but it will also create more definition in the appearance of the product. A definite advantage especially on the window side. The tab could also serve as a point to attach another tabbed layer in a more energy conscious market (Finland). The tab needs to be at least 1/16th of an inch wide and can be much wider if needed. Cell sizes could also be much larger. The minimum size is shown.



Two extruded adhesive bonds

Tubes are double bonded and stacked



Extruded adhesive bond

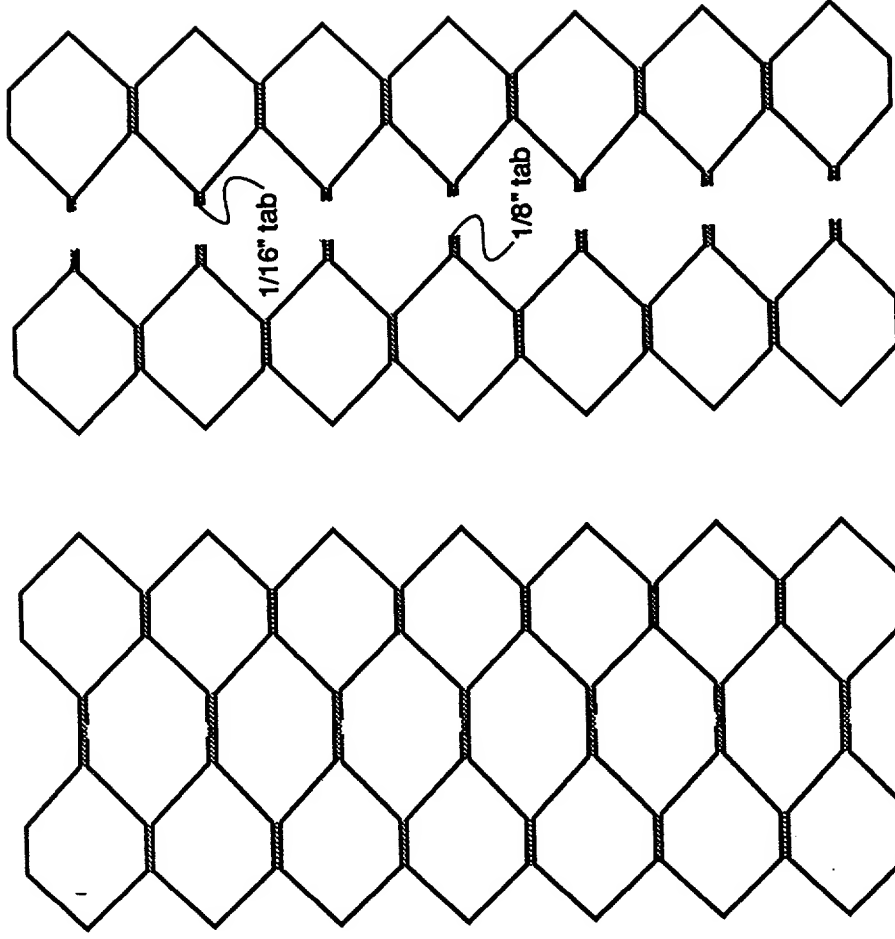
Tube is bonded to itself



Flat strip is folded into tube

## Two Symmetrical Tabbed Honeycombs -

made simultaneously by splitting in half a triple cell honeycomb made by the strip process.



Triple cell split into two single cell honeycombs with tabs. The tabs can be any size greater than .06\".

Stretched stack forms a triple cell honeycomb which might be practical for some energy conservation products or is split.

Scale: actual size

Ren Judkins & Company

T19

## DECLARATION FOR PATENT APPLICATION

Docket No. \_\_\_\_\_

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled  
PLEATED AND CELLULAR MATERIALS

\_\_\_\_\_, the  
specification of which (check one):

X is attached hereto  
\_\_\_\_\_ was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_  
\_\_\_\_\_ and was amended on \_\_\_\_\_, if applicable

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Date/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>08/756,282</u> (Application Serial No.)	<u>11/25/96</u> (Filing Date)	<u>Pending</u> (Status: patented, pending, abandoned)
<u>08/412,875</u> (Application Serial No.)	<u>3/29/95</u> (Filing Date)	<u>Patented</u> (Status: patented, pending, abandoned)

I hereby appoint the following attorney(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith: Lynn J. Alstadt, Reg. No. 29,362; George P. Baier, Reg. No. 26,717; Michael L. Dever, Reg. No. 32,216; John E. Grosselin, III, Reg. No. 38,478; Michael G. Panian, Reg. No. 32,623, and Carla J. Vrsansky, Reg. No. 36,958.

Address all telephone calls to Lynn J. Alstadt

Address all correspondence to Buchanan Ingersoll Professional Corporation  
One Oxford Centre  
301 Grant Street, 20th Floor  
Pittsburgh, Pennsylvania 15219-1410  
412-562-1632

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Ren Jenkins  
Inventor's Signature *Ren Jenkins* Date Jun 30, 1998  
Residence Pittsburgh, Allegheny County, Pennsylvania Citizenship USA  
Post Office Address 46 Newgate Road, Pittsburgh, Pennsylvania 15202

Full name of second joint inventor \_\_\_\_\_  
Inventor's Signature \_\_\_\_\_ Date \_\_\_\_\_  
Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
Post Office Address \_\_\_\_\_

Full name of third joint inventor \_\_\_\_\_  
Inventor's Signature \_\_\_\_\_ Date \_\_\_\_\_  
Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
Post Office Address \_\_\_\_\_

Full name of fourth joint inventor \_\_\_\_\_  
Inventor's Signature \_\_\_\_\_ Date \_\_\_\_\_  
Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
Post Office Address \_\_\_\_\_

Full name of fifth joint inventor \_\_\_\_\_  
Inventor's Signature \_\_\_\_\_ Date \_\_\_\_\_  
Residence \_\_\_\_\_ Citizenship \_\_\_\_\_  
Post Office Address \_\_\_\_\_